MALIGNANT DISEASE OF THE LARYNX; TOTAL LARYNGECTOMY.[1]

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MALIGNANT disease of the larynx occurs with sufficient frequency to excite more than passing attention from the body of the medical profession, and has received very careful study on the part of laryngologists. During the past seven years the subject has been a main point of discussion at a number of important meetings, particularly the Twelfth, Thirteenth, and Fourteenth International Medical Congresses at Moscow, Paris, and Madrid; the annual Congress of the American Laryngological Association at Washington in 1900; the German Surgical Congress in 1900, and the last meeting of the British Medical Association. The question, however, of treatment has not been positively settled, and it is intended in this paper to consider briefly the generally accepted as well as the mooted points of the therapy. The following case will serve to illustrate some of the questions which are to be considered:

Epithelioma of the Larynx; Laryngo-fissure twice performed; Recurrence; Total Laryngectomy.—M. K., aged forty-two years, a native of California, and a farm laborer by occupation, gives the following history: His father died at sixty-five of pneumonia, his mother at sixty-five of "jaundice." Two brothers are dead, one of pneumonia and one of abscess of the right side of abdomen. One sister died at fifty-two of "paralysis." Four brothers are living and in good health.

Habits.—He has used tobacco to excess, and inhaled cigarettes up to two years ago. Alcohol in moderation.

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Past History.—Measles and whooping-cough in childhood. Malaria several times during past twenty years. Luetic infection about twenty years ago.

Present Illness.—About five years ago, after sleeping outdoors during the harvest season, became hoarse. This hoarseness continued for three years in about the same degree; but two years ago it became decidedly worse. A physician who was at that time consulted stated that the vocal cords were thickened. After being under the treatment of several physicians, he was referred to Dr. George H. Powers, of this city, who put him on iodides in increasing doses up to sixty grains three times a day. During all this time patient was getting worse. Dr. Powers found a number of tumor masses above and below the vocal cords, and had the sputum examined for tubercle bacilli, but with negative result. Suspecting malignant disease, he sent the patient to the City and County Hospital, May 6, 1903, where he came under my charge in the absence of my chief, Dr. T. W. Huntington. On the following day I did a low tracheotomy, followed by a laryngotomy under cocaine anæsthesia, and removed all the tumor masses, including the vocal cords, which were both affected. A microscopical examination showed epithelioma.

August 31, 1903, the patient re-entered the City and County Hospital complaining of marked dyspnœa. A laryngoscopic examination at that time showed a marked stenosis of the upper portion of the larynx. No tumor masses could be seen. There was an abscess cavity on the left side of the larynx externally, following infection from the first operation. On that day I again did a laryngotomy under local anæsthesia, removed a number of small tumors from the upper and middle portions of the larynx, and dissected away the cicatricial bands which encroached on the lumen of the larynx. Microscopical examination of the tumors again showed epithelioma.

The laryngeal wound was left open. Nine days later the patient was subjected to X-ray treatment through the open wound in the larynx, but it was discontinued after nine treatments, which were without apparent benefit, as the obstruction kept increasing and made necessary the insertion of a tracheotomy tube in the larynx.

September 22, 1903. Three weeks after the second operation,

I removed the entire larynx, following quite closely the technique as elaborated by Keen, of Philadelphia. A median incision was made from above the hyoid bone to a point one and one-half inches above the sternum. The trachea was dissected free, necessitating division of the isthmus of the thyroid. The trachea was divided across between the third and fourth rings, and the lower portion drawn forward and downward and attached to the skin by a number of catgut sutures. A tracheotomy tube was then inserted and the anæsthetic continued through it. With the patient in the Trendelenburg position, the larynx was excised: a rather difficult procedure in this case, owing to adhesions due to the previous operations. An abscess cavity was found extending along the left cornu of the hyoid bone. The epiglottis was dissected out separately, except a small portion of the tip, which was unintentionally left. The mucous membrane of the pharynx was next sutured together with catgut, and a few sutures employed to bring together the muscles of the pharynx. The hæmorrhage was not severe, and was mostly from the thyroid isthmus. The greater part of the wound was closed with silkworm gut, with a cigarette drain in the abscess cavity along the hyoid. The tube in the trachea was removed and an open pill-box covered with moist warm gauze placed over the trachea. Chloroform was the anæsthetic used. The anæsthetist's record of blood-pressure and pulse showed no marked shock during the operation; but for a couple of hours after the operation, with the patient still in the inclined position, the pulse was almost imperceptible, and the respirations were reduced to four per minute. Oxygen and stimulants were administered and had the desired effect.

Two days after the operation the patient was allowed to drink sterile water. Four days later, patient was up and around and could eat soft food. One month after the operation the patient had gained seventeen pounds, and, except for a small discharging sinus which was believed to be due to the infection along the hyoid bone, he was apparently perfectly well. A Gluck phonation apparatus was fitted on him and he went back to his home. He was under the care of Dr. T. J. Patterson, of Visalia, at intervals; but the sinus still refusing to heal, and a hard mass being felt at the bottom of the wound, Dr. Patterson advised him to come back to me for further treatment.

FIG. 1.—Result after total extirpation of larynx. Patient wearing the phonation apparatus of Gluck.

February 11, 1904. I excised the hard mass, which was half the size of the original larynx and quite closely attached to the œsophagus. During its extirpation a small portion of the anterior wall of the œsophagus was removed. This defect was readily closed with a double row of catgut sutures and the wound closed with a cigarette drain.

Examination of the mass shows a considerable amount of bony cartilage, which probably grew from the perichondrium left behind, and softer tissue which is epitheliomatous. As to the final outcome of this case, I still hope to report a favorable result. The mistake I made was in not insisting upon a total laryngectomy at the first sign of recurrence, although it is doubtful if the patient would at that time have consented to the procedure.

The division of Krishaber, of cancer of the larynx into intrinsic and extrinsic forms, seems an important one from the standpoint of prognosis as well as treatment. The intrinsic cancers are those beginning in the vocal cords, the ventricular bands or the parts below; while the extrinsic start in the epiglottis, the arytenoids, or the other portions of the pharynx outside of the larynx proper. In the former the growth increases slowly; metastases to the lymph-nodes are rare and late in the disease, and there is little tendency for the tumor to extend beyond the limits of the larynx. In the extrinsic forms the lymphatic involvement is early, the course is more rapid, and the contiguous structures in the neck are apt to become affected. It will be readily understood, then, that the prognosis of the extrinsic form is more grave than that of the intrinsic. Fortunately, however, the former occurs about half as frequently as the latter.

It is not within my province or the scope of this paper to consider the symptoms of malignant disease of the larynx nor the matter of diagnosis, except in so far as it involves the removal of tissue for examination. It has been shown that a microscopical diagnosis may be entirely misleading when the bit of suspected growth has been removed by an intralaryngeal operation; the cancer-cells may be deeply seated in the mucous

membrane and escape the grasp of the instrument. One prominent laryngologist, Mackenzie, of Baltimore, objects to the intralaryngeal removal of pieces of tissue, fearing infection at the point of incision, the stimulation of the local growth and metastases elsewhere; but, as a microscopical examination can be made inside of twenty-four hours, those objections would scarcely hold good, providing the patient were immediately operated upon. If, after a careful clinical study, a diagnosis of cancer is made and the microscopical findings are not in harmony with it, I believe that a laryngotomy is in order for the double purpose of removing sufficient tissue for further examination and of doing whatever is necessary in an operative way.

Laryngotomy can and should preferably be done under local anæsthesia, and if one can secure the services of a competent pathologist, sections of the growth can be made and reported upon in about fifteen minutes. If the report is favorable, the wound can be closed and the damage to the larynx, if any, is slight. If, on the other hand, the diagnosis of cancer is confirmed, the operative treatment may be proceeded with according to the plan which seems best.

We come now to the question of treatment. There is no medicinal treatment which has proved of any avail in malignant disease of the larynx. The X-rays have been used in a number of cases with two or three reported cures (Cott, Scheppegrell); but I fear the history of that treatment will be similar to that we are now obtaining from those who have used the X-rays for malignant disease elsewhere,—a large proportion of recurrences after apparent cures (Coley). In my own case the epithelioma continued to grow despite the direct application of the rays through a fissure of the larynx. Mention should be made of a simple tracheotomy as a palliative measure to be used in some cases so far advanced that all hope of radical treatment is out of the question.

When we come to consider the operative treatment, we have at our command five different procedures: 1. The intralaryngeal removal as advocated especially by B. Fraenkel and

Jurasz. 2. The removal by laryngo-fissure, to which the names of Sir Felix Semon and Mr. Butlin are often attached. 3. The subhyoid pharyngotomy of Malgaigne as perfected by Kocher. 4. The more radical removal by partial excision. 5. Total extirpation as first performed by Watson and Czerny and perfected by Gluck and others.

I cannot but believe that the intralaryngeal method is based on a wrong principle, for the efforts to thus eradicate a disease which early invades structures quite remote from the original focus are wasted in the great majority of cases and valuable time is lost. It is true that a few cures have been reported, but they are the exception and not the rule.

Laryngo-fissure, or laryngotomy, is considered by a number of authorities (Semon, Butlin, v. Bruns, Moure) as the normal procedure. The results have been very good in the hands of the above-mentioned observers, while many others have reported poor results, probably owing to the fact that the limitations of the method were not well understood. Semon states that "The operation must be restricted to early stages of intrinsic malignant disease," while Moure, of Bordeaux, is more specific, and says, "It ought to be reserved exclusively for malignant growths originating in the interior of the larynx, and especially for tumors of one or other of the vocal cords. When one of the ventricular bands is affected, when there is peripheral infiltration, still more when the corresponding arytenoid cartilage is fixed, or when there are signs of perichondritis, it is unsuitable, and ought to be rejected as a means of cure." The operation is quite simple as a rule. Under 1 per cent. cocaine anæsthesia the skin is incised from the hyoid bone to below the cricoid cartilage, and the thyroid and cricoid cartilages divided exactly in the median line. The head should be hanging over the edge of the table or the whole body should be elevated in order to prevent blood running down the trachea. As the edges of the cartilage are spread apart, a solution containing cocaine 5 per cent., antipyrin 5 per cent., and carbolic acid 1 per cent., should be painted over the interior of the larynx. I should think that the local use of

adrenalin would also be of value. In a few minutes the laryngeal reflex will be abolished and a thorough view of the interior may be obtained. One is often surprised to find a very much worse condition than was apparent on laryngoscopic examination. The malignant growth, if still confined to the cords, should be excised, together with a wide margin of normal mucous membrane. The larynx should then be accurately closed by catgut sutures. Some operators leave a tracheotomy tube for a day or two, but it can generally be dispensed with. Subhyoid pharyngotomy by the transverse incision of Kocher gives a good exposure of the upper portion of the larynx and the adjoining pharynx. For the extrinsic malignant growths of the larynx it is often useful.

Partial laryngectomy involves a technique not very dissimilar from the total excision, and needs but a few words of comment. The larynx is divided in the median line as in a laryngo-fissure; the diseased half isolated by a careful dissection close to the cartilages, and, when the posterior aspect is made free from the œsophagus, it should be divided also in the median line. A tracheotomy tube is introduced into the lower portion of the wound and the soft parts closed over the remaining half of the larynx. In a number of reported cases the results were excellent, especially as regards phonation and cosmetic appearances.

The best method of total laryngectomy is, I believe, that elaborated by Keen, who combined a number of procedures devised by other men into a good working plan. The principal steps of his operation have already been mentioned and need not be repeated.

The removal of the larynx under local anæsthesia is feasible, and has been performed by at least one operator (Davis), but chloroform will probably continue to be the anæsthetic of choice. I believe, however, that the suggestion of Crile to apply cocaine to the interior of the larynx will diminish laryngeal shock. In another case I should have the larynx thoroughly cocainized some minutes before the operation.

Föderl's method of uniting the stump of the trachea to

the epiglottis and the aryepiglottic folds or to the hyoid bone, is a valuable operation when the trachea can be sufficiently mobilized to permit of its attachment so high up without undue tension. A possible objection to the operation to me is the danger of malignant disease of the trachea, in case of a recurrence in the wound, preventing any further operative measures.

The laryngoplastic operations of Gluck are particularly useful when the œsophagus, pharynx, or other structures adjacent to the larynx are involved in the cancerous process. Gluck has achieved wonderful results through his extensive and bold dissections, and his example is sure to be followed—in this country at least.

The statistics of operations for the relief of malignant disease of the larynx are, as Delavan has well shown in a paper before the American Laryngological Association in 1900, of no value, because they are based upon insufficient reports of cases, because many cases are not reported at all, and because the final results are seldom obtainable. The statistics of some individual operators, however, are of value, and show a steady improvement in the mortality and the recurrences. The greatest danger of the major operation on the larynx is pneumonia, generally of the inhalation type; but improvements in operative technique have led to a marked lessening of this danger.

The use of an artificial larynx is advisable in certain cases, and the form of it will depend largely upon the character of the wound. Where there remains a communication between the trachea and the mouth, the instrument selected will be of the type devised by Gussenbauer or its various modifications. When, however, the trachea is attached to the skin of the neck low down and the pharynx is closed, the phonation apparatus of Gluck is very useful, as may be noted in the case of the patient here presented (Fig. 1). With this apparatus he can speak very plainly. I can understand him at a distance of fifty feet or more. The apparatus consists simply of a metal box fitting accurately into the outer end of a tracheotomy tube which is worn during the daytime. The box has an inlet for air provided with a valve, while the exit for the air is through

a tube running up into the mouth. In the course of this latter tube is the so-called voice,—a pitch-pipe in my case, as I have been unable to secure the Gluck apparatus. Sometimes the tube is inserted through a nostril to the nasopharynx just behind the uvula, and in other cases it is passed into the mouth through a permanent opening in the cheek. The last-mentioned route seems to me unnecessary. In the more extensive operation of Gluck, when removal of part of the œsophagus is necessary, a prothetic appliance for it as well as for the trachea may be demanded. Freund succeeded in making a very ingenious contrivance which was quite efficient.

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